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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/697,763

10/30/2003

Heikki Heikkila

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08/09/2005

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EXAMINER

KHARE, DEVESH

ART UNIT

PAPER NUMBER

1623

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/697,763

Applicant(s)

HEIKKILA ET AL.

Examiner

Devesh Khare

Art Unit

1623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-74 is/are pending in the application.
- 4a) Of the above claim(s) 63-74 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-62 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/24/2005, 4/13/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Art Unit: 1623

Applicant's election with traverse dated 5/27/2005 of claims 1-62 of Group III, is acknowledged. The traversal is on the ground(s) that "Groups I, II and III are all related in such a way that they are not "independent" for purposes of establishing a restriction requirement". In the instant case the product by process claims 63-72 are drawn to crystalline L-arabinose of Group I; claims 73 and 74 are drawn to the use of product of Group I in pharmaceuticals and foodstuffs of Group II and the elected claims 1-62, Group III drawn to a process for preparation of the product of Group I, indicating that a process for using the product can be practiced with another materially different product i.e. use of the product of Group I in pharmaceuticals and foodstuffs, can be practiced with another materially different product such as pectic substances or the process for making the product can be practiced with another materially different process, which would impose a burdensome search upon the examiner, as it cannot be assumed that the burden of search under multiple classes would not create an undue burden. The examiner has determined the multiplicity of classes and divergent subject matter will indeed impose an undue burden.

The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and a product claim is subsequently found allowable, withdrawn process claims that depend from or otherwise include all the limitations of the allowable product claim will be rejoined in accordance with the provisions of MPEP § 821.04. **Process claims that depend from or otherwise include all the limitations of the patentable product** will be entered as a matter of right if the amendment is presented prior to final rejection or allowance, whichever is earlier. Amendments submitted after final rejection are governed by 37 CFR 1.116; amendments submitted after allowance are governed by 37 CFR 1.312.

In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103, and 112. Until an elected product claim is found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process

Art Unit: 1623

claims that are not commensurate in scope with an allowed product claim will not be rejoined. See "Guidance on Treatment of Product and Process Claims in light of *In re Ochiai*, *In re Brouwer* and 35 U.S.C. § 103(b)," 1184 O.G. 86 (March 26, 1996). Additionally, in order to retain the right to rejoinder in accordance with the above policy, Applicant is advised that the process claims should be amended during prosecution either to maintain dependency on the product claims or to otherwise include the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder.** Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

The requirement is still deemed proper and is therefore made FINAL.

The claims which read upon the elected invention are 1-62.

Claims 63-74 are withdrawn from further consideration by the examiner, 37

CFR 1.142(b), as being drawn to a non-elected invention.

An action on the merits of claims 1-62 is contained herein below.

Minor objections

1. Claims 2,3,13-18,43-45, 48-51 and 54-60 are objected to because of the following informalities:

In claims 2,3,13-18,43-45, 48-51 and 54-60, the abbreviations "DS" should be preceded in their first occurrence by the specific identity of the entities said abbreviations are intended to represent in the claims. Thereafter, the use of the abbreviation in the claims will be favorably considered and explicitly understood.

2. The IDS dated 5/03/2004 should be provided on Form PTO-1449 for consideration.

Appropriate correction is required.

35 U.S.C. 112, second paragraph rejection

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims **1-62** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(A) Claim 1 is vague and indefinite with respect to the following phrases:

Hydrolysis: It is unclear whether the hydrolysis in step (a) is intended to be acid or alkaline or both.

Fractionation: It is unclear whether the fractionation in step (c) is intended to be chromatographic fractionation or fractionation by distillation or filtration.

(B) The term "and/or" in all occurrences render the claims vague and indefinite as it is unclear whether the term "and/or" is intended to be included as 'and' or 'or'.

(C) The phrase "disaccharides as the nanofiltration retentate" in claim 33 renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

(D) Claim 61 is vague and indefinite with respect to the following phrase:

Epimerization: It is unclear whether the epimerization is accomplished by an enzymatic reaction or a chemical reaction.

Claims which depend from an indefinite claim which fail to obviate the indefiniteness of the claim from which they depend are also seen to be indefinite and are also rejected for the reasons set forth supra.

Art Unit: 1623

35 U.S.C. 103(a) rejection

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims **1-62** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ingle et al.

(Ingle) (Res. & Ind. 30, 369-373, 1985) in combination with Jumppanen et al.

(Jumppanen) (U.S. Patent 6,506,897) in view of Antila et al. (Antila) (U.S. Patent 6,506,897).

Claims 1-62 are drawn to a process of recovering arabinose and optionally at least one other monosaccharide selected from the group consisting of galactose, rhamnose and mannose from vegetable fiber comprising the following steps:

(step a): controlled hydrolysis of said vegetable fiber;

(step b): optional neutralization of the aqueous hydrolyzate of step (a); followed by at least one of the following steps:

(step c): fractionation of said aqueous hydrolyzate; and

(step d): crystallization of arabinose.

Dependent claim limitations include:

Vegetable fiber such as exudates gum selected from gum Arabic, gum ghatti and gum tragacanth; sugar beet pulp; and hardwood bark (**claims 2-9**);

Hydrolysis of more than 80% of said vegetable fiber (**claims 10-12**);

Art Unit: 1623

Hydrolysis conditions: content of arabinose more than 10%, content of galactose less than 5%, hydrolysis carried out in the range of 70 to 140 C, at a pH in the range of 0.7 to 2.5 for 0.4 to 6 hours using sulphuric acid (**claims 13-21**);

Fractionation: fractionation is carried out using cation and anion exchange resins (**claims 22-30, and 34-36**);

Fractionation by membrane filtration (**claims 31-36**);

Crystallization of arabinose comprises boiling and cooling crystallization (**claims 37-60**);

Process of claim 1 further comprises epimerization of arabinose to ribose (**claim 61**);
and

The process of claim 1 produces L-arabinose (**claim 62**).

Ingle teaches a process to prepare arabinose from gum ghatti (abstract). Ingle discloses that the vegetable fiber exudates gum ghatti is mainly composed of L-arabinose and also contains other monosaccharides such as galactose and mannose (col. 4, lines 22-26) and its use in medical glove and other articles (page 370, col. 1, Experimental procedure, lines 1-3). Ingle discloses a process to recover L-arabinose from the said gum by carrying out an acid hydrolysis in the range of 90- 92⁰ C followed by neutralization (page 370, col. 2, Experimental procedure, 1st para.). Ingle discloses the preparation of acid mixture by diluting 600 ml of concentrated sulphuric acid into two liters of water (page 370, col. 1, Experimental procedure, last 3 lines). Ingle also discloses 30-32% completion of the said hydrolysis in 3 hours with 0.5% sulphuric acid in solution (page 371, col.2, 1st para.). The crystallization of L-arabinose at -5⁰ C is

Art Unit: 1623

disclosed (page 371, col.1, 1st para.). Furthermore, Ingle discloses a slight impurity of galactose along with the crystallized L-arabinose (page 371, col.1, 3rd para.). Ingle differs from the applicant's invention in that Ingle does not provide the fractionation step of the hydrolysis process, the epimerization of arabinose to ribose and the specific details of the crystallization of L-arabinose.

Jumppanen teaches a process for preparing L-ribose from L-arabinose by an epimerization reaction (abstract). Jumppanen discloses the said epimerization process in the presence of a molybdenum catalyst (col. 3, lines 15-65 thru col.4, lines 1-50).

Antila teaches the purification of L-arabinose by chromatographic separation of L-arabinose by means of cation and anion exchangers and adsorbent resins followed by the recovery of L-arabinose by crystallization (abstract). Antila disclose the preparation of L-arabinose by acid hydrolysis from arabinose –containing vegetable materials such as gum Arabic and sugar beet pulp (col.1, lines 15-20). Antila discloses the use of cation and anion resins in the purification and color removal of L-arabinose preceding to the crystallization of L-arabinose (col. 1, lines 60-65). Antila disclose the cation exchange resin in monovalent metal (Na^+) form (col. 1, lines 35-40). Antila discloses the boiling and cooling crystallization of L-arabinose (col. 2, lines 60-65). Antila discloses the cooling crystallization of L-arabinose having arabinose purity over 98% (col. 3, lines 35-40).

Therefore, one of ordinary skill in the art would have found the applicants claimed process of recovering arabinose and optionally at least one other monosaccharide selected from the group consisting of galactose, rhamnose and mannose from

Art Unit: 1623

vegetable fiber, to have been obvious at the time the invention was made having the above-cited references before him. Since Ingle discloses that the vegetable fiber exudates gum ghatti is mainly composed of L-arabinose and also contains other monosaccharides such as galactose and mannose and its hydrolysis to obtain L-arabinose; Jumppanen discloses a process for preparing L-ribose from L-arabinose by an epimerization reaction and Antila discloses the purification of L-arabinose by chromatographic separation of L-arabinose by means of cation and anion exchangers and adsorbent resins followed by the recovery of L-arabinose by boiling and cooling crystallization, one skilled in the art would have a reasonable expectation for success in combining the cited references to obtain arabinose and optionally at least one other monosaccharide selected from the group consisting of galactose, rhamnose and mannose from vegetable fiber. Ingle provides the motivation to produce L-arabinose from vegetable sources because L-arabinose is widely distributed in plant products such as gums and L-arabinose can be used to substitute glucose in the diet to diabetic patients (page 369, col.1, 1st and 2nd paras.).

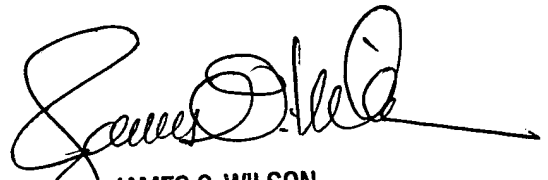
Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Devesh Khare whose telephone number is 571-272-0653. The examiner can normally be reached on Monday to Friday from 8:00 to 4:30. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James O. Wilson, Supervisory Patent Examiner, Art Unit 1623 can be

Art Unit: 1623

reached at 571-272-0661. The official fax phone numbers for the organization where this application or proceeding is assigned is (703) 308-4556 or 308-4242.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1235.

Devesh Khare, Ph.D.,JD.
Art Unit 1623
August 2,2005



JAMES O. WILSON
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